

Application No.:10/728,135

Docket No.: JCLA12578

REMARKSPresent Status of the Application

The Office Action rejected all presently-pending claims 1-13. Specifically, the Office Action rejected claims 1-13 under 35 U.S.C. 102(e), as being anticipated by Huang (U.S. Patent No. 6,939,664).

Discussion of Office Action Rejections

The Office Action rejected claims 1-13 under 35 U.S.C. 102(e), as being anticipated by Huang (U.S. Patent No. 6,939,664). Applicants respectfully traverse the rejections for at least the reasons set forth below.

Independent claim 1 recites the features as follows:

1. An immersion lithography process, comprising:  
forming a photoresist layer on a material layer;  
forming a protective layer on the photoresist layer;  
performing an immersion exposure step to define an exposed portion and an unexposed portion in the photoresist layer;  
performing a solubilization step to solubilize the protective layer on the exposed portion of the photoresist layer; and  
performing a development step to remove the exposed portion of the photoresist layer and the protective layer thereon.

(emphasis added).

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Claims 2-6 also recite the similar features.

Independent claim 7 recites the features as follows:

7. An immersion lithography process, comprising:  
forming a photoresist layer on a material layer;  
forming an acid supplying layer on the photoresist layer;  
forming a protective layer on the acid supplying layer;  
performing an immersion exposure step to define an exposed portion and an unexposed portion in the photoresist layer, while an acid is produced in the acid supplying layer;  
performing a solubilization step to make the acid produced in the acid supplying layer diffuse to the protective layer and the unexposed portion of the photoresist layer;  
and  
performing a development step to pattern the protective layer, the acid supplying layer and the photoresist layer simultaneously.

(emphasis added).

Claims 8-10 also recite the similar features.

Independent claim 11 recites the features as follows:

11. A mask layer structure applied in an immersion lithography process, comprising:  
a photoresist layer on a material layer; and  
a protective layer on the photoresist layer for preventing mutual diffusion between the photoresist layer and an immersion liquid used in an immersion exposure step of the immersion lithography process.

(emphasis added).

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Claims 12-13 also recite the similar features.

In re U.S. Patent No. 6,939,664, Applicant considers that Huang et al. do not disclose all limitations recited in the claims 1, 7 and 11. The difference between independent claims 1, 7, 11 and U.S. Patent No. 6,939,664) is shown in Table I.

Claim	The present invention	U.S. Patent No. 6,939,664
1	An immersion lithography process, comprising: forming a photoresist layer on a material layer;	The present invention is directed to a method of forming a structure on a substrate, including the steps: (a) providing a substrate; (b) applying a resist composition to the substrate to form a resist layer on the substrate, wherein the resist composition includes (i) an acid-sensitive imaging polymer, and (ii) a radiation-sensitive acid generator, wherein ... (see column 4, lines 55-67)
	forming a protective layer on the photoresist layer;	<u><b>**There is no description regarding to the protective layer formed on the photoresist layer.</b></u>
	performing an immersion exposure step to define an exposed portion and an unexposed portion in the photoresist layer;	(c) patternwise exposing the substrate to radiation, whereby acid is generated by the radiation-sensitive acid generator in exposed regions of the resist layer; (see column 5, lines 1-3)
	performing a solubilization step to solubilize the protective layer on the exposed portion of the photoresist layer; and	<u><b>**There is no description regarding to the step of solubilizing the protective layer on the exposed portion of the photoresist layer".</b></u>

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	performing a development step to remove the exposed portion of the photoresist layer and the protective layer thereon.	(d) removing patternwise soluble portions of the resist layer to form a pattern of spaces in the resist layer; and (see column 5, lines 4-6)  <u><b>**There is no description regarding to removal of the protective layer.</b></u>
7	An immersion lithography process, comprising: forming a photoresist layer on a material layer;	The present invention is directed to a method of forming a structure on a substrate, including the steps: (a) providing a substrate; (b) applying a resist composition to the substrate to form a resist layer on the substrate, wherein the resist composition includes (i) an acid-sensitive imaging polymer, and (ii) a radiation-sensitive acid generator, wherein ... (see column 4, lines 55-67)
	forming an acid supplying layer on the photoresist layer;	<u><b>**There is no description regarding to the acid supplying layer formed on the photoresist layer.</b></u>
	forming a protective layer on the acid supplying layer;	<u><b>**There is no description regarding to the protective layer formed on the acid supplying layer.</b></u>
	performing an immersion exposure step to define an exposed portion and an unexposed portion in the photoresist layer, while an acid is produced in the acid supplying layer;	(c) patternwise exposing the substrate to radiation, whereby acid is generated by the radiation-sensitive acid generator in exposed regions of the resist layer; (see column 5, lines 1-3)
	performing a solubilization step to make the acid produced in the acid supplying layer diffuse to the protective layer and the unexposed portion of the photoresist layer; and	<u><b>**There is no description regarding to the acid supplying layer".</b></u>

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	performing a development step to pattern the protective layer, the acid supplying layer and the photoresist layer simultaneously.	(d) removing patternwise soluble portions of the resist layer to form a pattern of spaces in the resist layer; and (see column 5, lines 4-6)  <u><b>**There is no description regarding to removal of the protective layer and the acis supplying layer.</b></u>
11	a photoresist layer on a material layer; and	(a) applying a resist composition to the substrate to form a resist layer on the substrate, wherein the resist composition includes (i) an acid-sensitive imaging polymer, and (ii) a radiation-sensitive acid generator,... (see column 4, lines 58-67)
	a protective layer on the photoresist layer for preventing mutual diffusion between the photoresist layer and an immersion liquid used in an immersion exposure step of the immersion lithography process.	<u><b>**There is no description regarding to the protective layer formed on the photoresist layer</b></u>

Table I

In the content of this Office Action, several terminologies such as "imaging resist layer", "imaging resist", "photoresist layer", "imaging layer", "photoresist" and "resist layer" are cited. Applicants interpret those terminologies indicating a same layer that is substantially equivalent to "the photoresist layer" recited in claims 1, 7 and 11. Applicants submit that any one of the terminologies ("imaging resist layer", "imaging resist", "photoresist layer", "imaging layer", "photoresist" and "resist layer") would not be interpreted as "the protective layer" recited in claims 1, 7 and 11. In addition, any one of the terminologies ("imaging resist layer", "imaging resist", "photoresist layer", "imaging layer", "photoresist"

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and "resist layer" would not be interpreted as "the acid supplying layer" recited in claims 7 and 12.

As described above, Huang et al. (U.S. Patent No. 6,939,664) not only fail to disclose the use of "the protective layer" recited in claims 1-10, but also fail to disclose and "the acid supplying layer" of the mask layer structure recited in claims 11-13. Therefore, Applicants consider that the rejection of claims 1-13 should be withdrawn.

For at least the foregoing reasons, Applicant respectfully submits that independent claims 1, 7 and 11 patently define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 2-6, 8-10 and 12-13 patently define over the prior art as well.

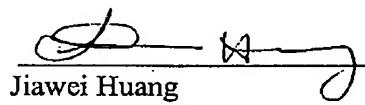
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For at least the foregoing reasons, it is believed that the pending claims 1-17 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,  
J.C. PATENTS

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4 Venture, Suite 250  
Irvine, CA 92618  
Tel.: (949) 660-0761  
Fax: (949)-660-0809

  
Jiawei Huang  
Registration No. 43,330